



# Prioritization 3.0/Strategic Transportation Investments

## BOT Approved Public Transportation Quantitative Scoring Criteria

September 10, 2013



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

# PUBLIC TRANSPORTATION DIVISION







# Eligible Project Types by Funding Category

Funding Category	Project Types		
	Fleet Vehicle Expansion	Facility Park and Ride Bus Shelter	Fixed Guideway
<b>Statewide</b> (100% Criteria Score)	Not Eligible	Not Eligible	Not Eligible
<b>Regional</b> (70% Criteria Score)	Bus Van Light Transit	Facility, Bus Shelter, Park and Ride, Property Acquisition/Design/Construction, Paving/Resurfacing	Commuter Rail, Light Rail, Street Car, Bus on Shoulder, Bus Rapid Transit, Expansion/Replacement, Track Improvement/Extension
<b>Division</b> (50% Criteria Score)	Bus Van Light Transit	Facility, Bus Shelter, Park and Ride, Property Acquisition/Design/Construction, Paving/Resurfacing	Commuter Rail, Light Rail, Street Car, Bus on Shoulder, Bus Rapid Transit, Expansion/Replacement, Track Improvement/Extension



# PTD – Prioritization Development Process

**Data Sets:** safety recording data, vehicle utilization data, annual trips, service hours, and revenue hours

**Sources/Stakeholders:**

- Federal Transit Administration
- National Transit Database (NTD)
- Institute for Transportation Research and Education
- NCDOT
- Community Transportation Systems
- Urban Transit Systems
- Metropolitan Planning Organizations (MPO)
- Rural Planning Organizations (RPO)
- PTD State Management Plan



# Eligibility Definitions

	Statewide	Regional	Division
<b>Public Transportation</b>	N/A	<ul style="list-style-type: none"> <li>• Service spanning two or more counties and serving more than one municipality</li> <li>• Funding amounts not to exceed 10% of regional allocation</li> </ul>	<ul style="list-style-type: none"> <li>• Service not included on Regional</li> <li>• Multimodal terminals and stations serving passenger transit systems</li> </ul>



# System Service Definitions

**Demand Response:** A transit mode comprised of passenger cars, vans or small buses operating in response to calls from passengers or their agents to a transit operator, who then dispatches a vehicle to pick up and transport passengers to their destinations. The majority of these trips are scheduled at least 24 hours in advance. Services are open to the general public and to human service clients.

**Fixed Route:** A transit service in which vehicles run along an established path at preset times

**Note:** *Fixed Route and Demand Response are available in both urban and rural areas.*

**Fixed Guideway:** A system of vehicles that can operate only on its own corridor constructed for that purpose (e.g. commuter rail, light rail)





# EXPANSION VEHICLES



## Expansion Vehicles

Criteria	Regional – Proposed Weight		Division – Proposed Weight	
	Demand Response	Fixed Route	Demand Response	Fixed Route
Benefit/Cost	45%	45%	25%	25%
Vehicle Utilization Data	5%	5%	5%	5%
System Safety	5%	5%	5%	5%
Connectivity	5%	5%	5%	5%
System Operational Efficiency	10%	10%	10%	10%
	70%	70%	50%	50%

*Benefit/Cost is reflective of the impacts of the project and therefore weighted at a higher percentage.*





# Expansion Vehicle Criteria – Benefit/Cost

**Definition:** Benefit/Cost will assess the projected ridership for the life of the expansion vehicle relative to the cost of the vehicle to the state

**Measure:**

- **Demand Response** - Current annual average trips per vehicle multiplied by the life expectancy of the vehicle and divided by the amount of state match
- **Fixed Route (new route)** - Projected ridership for life of the vehicle divided by the state match
- **Fixed Route (headway reduction)** - Route ridership on the existing route for the life of the vehicle divided by the state match

***Note:** For consideration of an expansion vehicle, all systems must provide ridership projections. Efficiency benefits for hybrid vehicles will be used to adjust the projected cost of the vehicle to the state. Fuel savings average about \$65,112 for the life of a hybrid vehicle.*

**Scoring Scale:** Trips per dollar

**Recommended Weight:** Regional Transit Score – 45%

Divisional Transit Score – 25%



## Expansion Vehicle Criteria – Vehicle Utilization Data

**Definition:** Utilization of vehicles within the transit systems' fleet; higher vehicle utilization ratios indicate a greater need and lower ratios indicate a lesser need for expansion vehicles. This criteria recognizes systems that are maximizing their current assets

**Measure:**

- **Demand Response** - Maximum vehicles utilized during the peak hour as identified from the vehicle utilization data collection period divided by the total fleet size. (including spares)
- **Fixed Route** - Number of vehicles operated in maximum service divided by the number of vehicles available for maximum service

**Scoring Scale:** Vehicle Utilization as reported by National Transit Database (NTD) or NCDOT Operating Statistics Report

**Recommended Weight:**

- Regional Transit Score – 5%
- Divisional Transit Score – 5%



# Expansion Vehicle Criteria – System Safety

- Definition:** Comparing system safety statistics to the national average among comparable systems
- *Note: NTD uses rural and urban criteria, therefore, rural terminology replaces demand response and urban terminology replaces fixed route*
  - *Urban systems will use PMT (Million Passenger Miles Traveled).  
Rural systems will use Million Revenue Miles Traveled*

**Measure:** 
$$\frac{\text{National average reportable incidents}}{\text{PMT}} - \frac{\text{System reported incidents}}{\text{PMT}} + \frac{\text{National average reportable injuries}}{\text{PMT}} - \frac{\text{System reported injuries}}{\text{PMT}} + \frac{\text{National average reportable fatalities}}{\text{PMT}} - \frac{\text{System reported fatalities}}{\text{PMT}} = \text{Safety Result}$$

- Scoring Scale:**
- Urban System = Safety Result
  - Rural System = Safety Result

- Recommended Weight:**
- Regional Transit Score – 5%
  - Divisional Transit Score – 5%





## Expansion Vehicle Criteria – Connectivity/Accessibility

**Definition:** Connectivity/Accessibility will measure the connectivity of the proposed expansion of service to vital destinations (*medical, employment, commercial, education, and other transportation modes*)

**Measure:** The projected increase in ridership weighted according to the types of destinations the expansion of service will serve (*20% per destination: medical, employment, commercial, education, and other transportation terminal/transfer*)

**Scoring Scale:**  $(\text{Ridership Increase} \times \text{Facility Destination}) / \text{System Ridership} = \text{Weighted \% Increase in Ridership}$

**Recommended Weight:**

- Regional Transit Score – 5%
- Divisional Transit Score – 5%



# Expansion Vehicle Criteria – Operational Efficiency

**Definition:** To compare the number of trips to the amount of service hours or revenue hours reported

- **Revenue Hours** – The time a vehicle is available to the general public and revenue is generated
- **Service Hours** – The time a vehicle begins service includes revenue and non-revenue operations
- **Note:** *Trip information will be obtained from the National Transit Database and ITRE.*

**Measure:** Annual ridership divided by total hours (*Maximum of 100 points*)

**Scoring Scale:**

- Demand Response = Trips / Service Hours
- Fixed Route = Trips / Revenue Hours

**Recommended Weight:**

- Regional Transit Score – 10%
- Divisional Transit Score – 10%



# FACILITIES





# Facilities

Criteria	Regional - Proposed Weight		Division - Proposed Weight	
	Demand Response	Fixed Route	Demand Response	Fixed Route
Age of Facility Facility Demand Park & Ride Bus Shelter	40%	40%	30%	30%
Benefit Cost	5%	5%	5%	5%
System Operational Efficiency	5%	5%	5%	5%
Facility Capacity	20%	20%	10%	10%
Total	70%	70%	50%	50%



## Facilities Criteria – Age of Facilities

**Definition:** Replacement, improvement or construction of a new facility  
*(assumes an industry standard of 45 years as useful life,  
functionally obsolete facilities will be assigned an age of 45)*

**Measure:** Based on feasibility study and length of time a system has  
occupied current facility

**Scoring Scale:** Score = Facility Age / Useful Life

**Note:** *The percentage of the useful life will be used as the score for this criteria.*

**Recommended Weight:**

- Regional Transit Score – 40%
- Divisional Transit Score – 30%

**Note:** *Excludes Park & Ride and Bus Shelter*



# Facilities Criteria – Facility Demand

**Definition:** Measure of capacity or demand for the new or expanded Maintenance & Operations facilities and transit centers

**Measure:** Ratio of peak service vehicles to bus bays (*transit centers*) or maintenance capacity (*maintenance facilities*); percentage over capacity is the score  
(A ratio of 1 is at capacity, anything >1 is over capacity)

**Scoring Scale:** Score = Peak Service/Capacity

**Recommended Weight:**

- Regional Transit Score – 40%
- Divisional Transit Score – 30%





## Facilities Criteria – Park and Ride Demand

**Definition:** Park and ride lots benefit traditional bus, rail transit and Transportation Demand Management (TDM) modes like vanpools and carpools

**Measure:** The number of spaces in the lot multiplied by the estimated utilization divided by the state match. Estimated Utilization is determined by a feasibility study provided by local transit system.

**Scoring Scale:**  $\text{Score} = (\text{Number of Spaces} \times \text{Utilization}) / \text{State Match}$

**Recommended Weight:**

- Regional Transit Score – 40%
- Divisional Transit Score – 30%



## Facilities Criteria – Bus Shelter Demand

**Definition:** Gauges the relative need for bus shelter installation, including equipment, any right of way need, and if needed sidewalk connection to nearest intersection

**Measure:** Compare average boarding and alightings of the stops proposed to upgrades to shelters

***Note:** Specific stops must be identified and bus stop boarding and alighting data provided.*

**Scoring Scale:** Score = Average Boardings + Average Alightings

**Recommended Weight:**

- Regional Transit Score – 40%
- Divisional Transit Score – 30%



## Facilities Criteria – Benefit Cost

**Definition:** Examines the benefit (trips) relative to the cost of the project to the state

**Measure:** Annual trips provided by the facility divided by the cost of the project to the state

**Scoring Scale:**  $\text{Score} = \text{Annual Trips} / \text{State Match}$

### Recommended Weight

- Regional Transit Score – 5%
- Divisional Transit Score – 5%





# Facilities Criteria – Operational Efficiency

**Definition:** To compare the number of trips to the amount of service hours or revenue hours reported

- **Revenue Hours** - The time a vehicle is available to the general public and revenue is generated
- **Service Hours** – The time a vehicle begins service includes revenue and non-revenue operations

**Measure:** Annual ridership divided by total hours  
(Maximum of 100 points)

**Scoring Scale:**

**Demand Response** = Trips/Service Hour

**Fixed Route** = Trips/Revenue Hour

**Recommended Weight:**

- Regional Transit Score – 5%
- Divisional Transit Score – 5%



# Facilities Criteria – Facility Capacity

**Definition:** Identifies the need for additional usage capacity

**Measure:** The difference in the proposed capacity and the current usage compared to the existing design capacity during the peak period

**Scoring Scale:**

**Facility** (Transit & Admin.) =  $((\text{proposed capacity} - \text{current usage}) / \text{existing design capacity}) \times 33\%$

**Park & Ride** =  $((\text{proposed capacity} - \text{current usage}) / \text{existing design capacity}) \times 33\%$

**Shelters** =  $((\text{proposed capacity} - \text{current usage}) / \text{existing design capacity}) \times 33\%$

**Recommended Weight:**

- Regional Transit Score – 20%
- Divisional Transit Score – 10%



# FIXED GUIDEWAY



# Fixed Guideway

Criteria	Regional Proposed Weight	Division Proposed Weight
Mobility	20%	15%
Cost Effectiveness	15%	15%
Economic Development	20%	10%
Congestion Relief	15%	10%
Total	70%	50%





## Criteria – Mobility

**Definition:** Measures project usage

**Measure:** Estimated Annual Trips

**Scoring Scale:** 1 point for every 250,000 trips; this coincides with FTA's "High" ranking for 25 million or more trips

**Recommended Weight:**

- Regional Transit Score – 20%
- Divisional Transit Score – 15%



## Criteria – Cost Effectiveness

**Definition:** Cost per trip over the life of the project to evaluate the project investment

**Measure:** Measures the cost effectiveness of the project per trip over the life of the project

**Scoring Scale:** 100 points for a cost of \$4.00 or less per trip;  
decreasing by 1 point for each \$0.11 increase per trip

**Recommended Weight:**

- Regional Transit Score – 15%
- Divisional Transit Score – 15%



## Criteria – Economic Development

**Definition:** Growth in employment and population within  $\frac{1}{2}$  mile of project stations/stops

**Measure:** Measures the new employment and population growth in the fixed guideway corridor over 20 years

**Scoring Scale:** 1 point per 1,000 new employees and  
1 point per 500 new residents

**Recommended Weight:**

- Regional Transit Score – 20%
- Divisional Transit Score – 10%



## Criteria – Congestion Relief

**Definition:** Measure the expected travel time savings benefits of the project over a 30-year period. The measure listed below is borrowed from the roadway projects and will be replaced with FTA defined criteria once that is released. That will ensure consistency with the rest of the fixed guideway criteria.

**Measure:** Travel Time Savings – Time saved between two destinations before and after project divided by cost of the project

**Scoring Scale:** 0-100 point scale TBD; Max points = 100 (values over 100 are capped)

### Recommended Weight:

- Regional Transit Score – 15%
- Divisional Transit Score – 10%





## Example Scoring – Fixed Route Expansion

Criteria	Raw Score	Regional Impact		Division Needs	
		Weight	Score	Weight	Score
Benefit/Cost	29.14	45%	13.11	25%	7.29
Vehicle Utilization	78	5%	3.9	5%	3.9
System Safety	0.36	5%	0.02	5%	0.02
Connectivity	2	5%	0.1	5%	0.1
System Operational Efficiency	26.19	10%	2.62	10%	2.62
Total		70%	19.75	50%	13.93



## Example Scoring – Facility

Criteria	Raw Score	Regional Impact		Division Needs	
		Weight	Score	Weight	Score
Age of Facility Facility Demand Park & Ride Bus Shelter	55	40%	22	30%	16.5
Benefit Cost	1.45	5%	0.07	5%	0.07
System Operational Efficiency	14.72	5%	0.74	5%	0.74
Facility Capacity	5.28	20%	1.06	10%	0.53
Total		70%	23.86	50%	17.84



## Example Scoring – Fixed Guideway

Criteria	Raw Score	Regional Impact		Division Needs	
		Weight	Score	Weight	Score
Mobility	28	20	5.6	15%	4.2
Cost Effectiveness	0	15%	0	15%	0
Economic Development	100	20%	20	10%	10
Congestion Relief	0.012	15%	0	10%	0
Total		70%	25.6	50%	14.2